ART. VIII.—*Autopsy of a Case of Mania.* By A. M. SHEW, M.D., Superintendent of the General Hospital for the Insane, Middletown, Conn., and E. C. SEGUIN, M. D., of New York, Pathologist to the Institution.

Mania; granular degeneration of ventricles; cortical sclerosis of cord.—S. S., æt. 43, married, Can., stonecutter, admitted July 10, 1870. First symptoms noticed two months ago. Had a slight fit, which was followed by symptoms of subacute mania. He steadily grew worse and became unmanageable at home, on account of violence towards family and others. At times has been rational, but most of the time incoherent; having delusions in regard to being a policeman, owning livery stables, etc. Previously to his having this "fit" he was thought eccentric.

August 9. Has had no active symptoms until to-day, when he became delirious and required restraining in bed.

Sept. 1. Is up and about ward as usual, though he seems more stupid and irritable.

20*th.* Transferred to the "Excited Ward" on account of a growing disposition to molest other patients. Imagines that they call him bad names, etc. Patient is somewhat deaf.

Oct. 10. General health failing. Is taking tonics and stimulants. Soils clothing and bed.

Nov. 1. Did not seem to recognize his wife, who visited him two or three days ago. Frequently suffers from colic.

11*th.* At 6 o'clock A.M., was discovered in a "fit" by the attendant. The "fit" seems to be apoplectic. Has stertorous breathing; flushed countenance; pulse 132, and very strong, carotid arteries beating violently; pupils contracted and not responsive to light. No reflex movements of limbs produced by tickling feet. When first seen by attendant arms were jerking. No evident paralysis of any of the limbs. At 6 o'clock P.M., no material change. Has occasional spasmodic movements of arms, and spells of jerking, and irregular breathing. Sweats profusely, and passes large quantities of urine.

12*th.* A.M. Pulse not as strong. The paroxysms of irregular respiration continued through the night. No other change. Noon. Breathing more regular; pulse better; pupils respond to light; he makes attempts to swallow. Ordered some stimulants. Is sensible to pain of pricking and pinching. Right side apparently more sensitive than left. Temperature normal. 6 o'clock P.M. Swallows whiskey and water, though with some difficulty. Pulse 100.

13*th.* Apparently better. Takes milk-punch and beef-tea with less difficulty in swallowing. Respiration more regular. 5 P.M. Is about as in A.M. 7 P.M. Reported in a dying condition. Death took place at 9 P.M.

Autopsy.—Body examined twelve hours after death; weather cool. Rigor mortis moderate and universal. Some hypostatic congestion of skin of back and limbs. Small bed-sore formed over sacrum.

Spine and contents.—Fat next to dura mater injected. But little fluid under arachnoid. Dura mater and arachnoid appear perfectly healthy: there being a few filamentary adhesions between the two in region of cervical enlargement, posteriorly. On the anterior surface of spinal canal, there is found a small tumour, the size of a large pea, situated in the substance of the posterior common ligament, opposite the fibro-cartilage lying between the last dorsal and first lumbar vertebræ. It pushes the dura mater somewhat forward, but not enough to have produced any pressure on cord. The tumour is fibro-cartilaginous. On making sections through different parts of the cord, no abnormal appearance is discernible to the naked eye, except a very unusual development of vessels in the gray matter and near the anterior fissure. Spinal cord is placed in Müller's fluid for transportation.

Skull and contents.—Bones and dura mater normal. Pacchionian bodies unusually numerous. The arachnoid is not perfectly transparent along vessels, but the milkiness is hardly pathological. A minute inspection of the entire external surface of the cerebrum fails to reveal any lesions. The pia mater everywhere peels off well. On section, the gray matter of the convolutions appears unusually dark. The centrum ovale majus is much injected. Opto-striate bodies normal.

The ventricles are the seat of a very interesting lesion. In the first place, they are all considerably dilated, and contain a good deal of clear fluid.

Secondly.—The floor of the lateral ventricles, half way up the lateral boundary, appears granular and thickened. The granulations, easily felt and seen, are translucent, pearl-like, and vary much in size, from a mere point to the bulk of the head of a small pin. On passing the fingers over the diseased tissue it appears unusually firm. The third ventricle and infundibulum are considerably enlarged, and studded with granulations; the same being true of the aqueduct of Silvius. The foramina of Monro measured nearly one-quarter of an inch in diameter, and the lesion involves them, as well as the septum lucidum. The roof of the ventricles is normal; and so are the choroid plexuses.

Cerebellum appears perfectly normal: but the valve of Vieussens is the seat of the granular degeneration above described. Medulla oblongata appears healthy to naked eye, except that floor of fourth ventricle to the apex of the calamus scriptorius exhibits the granular degeneration; though to a less degree than the lateral and third ventricle. Nerves at base of brain appear normal.

Thorax and contents.—Heart normal, contracted; commencing atheroma of arch of aorta.

The lungs do not fully collapse on exposure. Left lung presents some recent adhesions of its lower part with costal pleura; no fluid. The lower lobe is hepatized, and presents a number of patches of commencing resolution; pieces sink in water. Lower part of upper lobe slightly congested; at apex there is a wrinkled cicatrix the size of an almond, underneath which lies a cretaceous mass as large as a pea, with tubercular(?) granulations, somewhat smaller, imbedded in the lung tissue around it, in a zone one inch in diameter. Right lung exhibits only extreme congestion and œdema of upper and lower lobes; the middle lobe being normal. No trace of tubercles in this lung.

Abdomen and contents.—The stomach is the seat of considerable ecchymosis along the lesser curvature, and there are traces of this in the large cul-de-sac. Kidneys of usual size; capsules peeling off normally. Cortical portion of right kidney is, perhaps, a little pale.

Liver, spleen, and intestines healthy. Some urine in bladder; is not albuminous.

Microscopical Examination. Spinal cord.—After hardening in a dilute solution of chromic acid, sections were cut horizontally from different regions of the spinal cord, and prepared by Clarke's method. That is to say, the cuts were stained by a neutral solution of carmine, soaked in alcohol, transferred to absolute alcohol, floated on oil of turpentine to give transparency, then mounted in Canada balsam dissolved in chloroform. The following is the result of the study of these sections in order, beginning above, with a power of one hundred diameters.

Section No. 1, made in the decussation of the pyramids. Circumferential layer of reticulum is perhaps a trifle heavier than usual, as are some of the trabeculæ running inward from it. The central canal is very small, but not altered; and no lesion is evident in the white or gray substances.

Section No. 2, made 3 c. below decussation. The increased thickness of the circumferential part of reticulum has become very decided, and constitutes a cortical sclerosis. The framework is denser, and secondarily the nerve fibres near the edge of the section are atrophied in large numbers; many bearing but a very small quantity of myeline around the axis cylinder, many others being apparently reduced to the latter element; the growth of the new fibrillar tissue having, as it were, strangulated them. The anterior fissure is widely open, the vessels running into it are abnormally large, and at its bottom, near the anterior commissure, there is a moderate amount of homogeneous effusion in the folds of the pia mater outside the vessels. On the left side, the anterior commissure is invaded, and somewhat broken down, by a dilated vessel with effusion of the same homogeneous material outside of it; in a manner precisely similar, though less in extent, to what exists in Section 4. The central canal is normal, but its cavity contains a quantity of the homogeneous effusion.

Section No. 3, made through the upper part of the cervical enlargement. The cortical sclerosis has diminished, but is still very evident and uniform. Near the bottom of the anterior fissure lies a dilated bloodvessel, and still deeper a quantity of homogeneous effusion, destroying, in great part, the left anterior commissure. There is also a want of symmetry between the anterior horns, the right being shorter, and looking a trifle more inward, than the left. The central canal is small, but normal.

Section No. 4, made through the middle of the cervical enlargement. The cortical sclerosis has again increased, and is greatest in posterior and lateral portions of the section. At the external end of the anterior fissure, there has been much increase of the connective tissue of the pia mater. With a higher power (300 diameters), this structure may be seen sprinkled with numerous nuclei, evidences of inflammatory irritation. This multiplication is especially marked round about the vessels of the anterior fissure, and in their adventitious coat. A narrow strip of pia mater extends from this part to the inner end, or bottom, of the anterior fissure, where it again expands, rich in nuclear elements, and bearing abnormally large bloodvessels, whose walls are decidedly thickened, and whose cavities are crammed with red blood corpuscles. In the middle, resting against the anterior commissure, in the midst of the connective tissue, is a mass of effused material, appearing homogeneous under a power of 100 diameters. From the pia mater, at the bottom of the fissure, there extends a new formation of fibrillar tissue filled with nuclei, inclosing bloodvessels, which has quite destroyed the left branch of the anterior commissure; the pathological product extending into the gray matter and posterior commissure. At the place of contact of the fibrillar tissue and the gray commissure, is another mass of homogeneous effusion. There is more or less condensation of tissue round about the central canal, the cavity of which contains a homogeneous material of same aspect as that found elsewhere. The invasion of the left anterior commissure by the diseased pia mater has produced a striking deformity in the white and gray matters of that side. The left anterior column is shortened, and rounded off below; the inner boundary line of the anterior horn is apparently shortened, and is thrown inward, so as to appear quite parallel with the anterior fissure. About one-fourth of the so-called posterior fissure is dilated, and the resulting space contains a thickened process of the pia mater, probably itself conveying an enlarged bloodvessel.

Section No. 5, made through the middle of the dorsal region. The cortical sclerosis continues marked, though less than in No. 4. At the bottom of the anterior fissure is some homogeneous effusion, but the commissure is intact. There is seen, back and to the left of the central canal, in the posterior commissure, an opaque red spot, contrasting sharply with the adjacent tissue, of an oval shape, measuring .21 by .13 mm., evidently a spot of sclerosis. The central canal is here very large, .5 mm. by .15 mm., irregularly quadrangular in outline, and is filled with homogeneous effusion.

Section No. 6, made through the middle of the lumbar enlargement. Cortical sclerosis moderate; exaggerated near points of exit of posterior roots. The anterior fissure and contained parts are very nearly normal; anterior commissure intact. The central canal appears as a slit running antero-posteriorly, one of its sides formed by tolerably distinct epithelium, the other broken down; and the lumen contains *debris* of epithelial elements. No trace of effusion outside of vessels.

Section No. 7, made at a point about 2 c. above end of cord. Shows very great cortical sclerosis, which is, however, quite uniform. Anterior fissure not much involved; it contains no effused matter. The central canal is represented by an ovoid mass of epithelial *debris.* The external layer of the reticulum, and the trabeculæ running inward from it, are immensely hypertrophied, and show, under a higher power, a distinct fibrillar structure. The nerve-fibres are consequently atrophied, and very few exhibit an envelope of myeline; the immense majority are indicated only by the round, nucleus-like body, the axis cylinder. Besides these, there are very numerous nuclei, belonging to the diseased reticulum. Beyond the external layer of reticulum are seen two fragments of pia mater, much heavier than normal, and showing nuclei.

Section No. 8, made at a point 1 c. above end of cord. The cortical sclerosis is here very considerable, the pia mater being remarkably thickened. The sclerosis is especially marked at the external end of the anterior fissure. In the fissure itself there is thickening of the pia mater, enlargement and thickening of bloodvessels; and around these there is some effusion more granular than that occurring higher up, and of a yellowish hue. Opposite the posterior fissure the sclerosis is much less intense; but it is again greater over the lateral columns. Around the central canal there is some slight condensation of tissue, the epithelium is fairly preserved, and there is no effusion in the cavity. The effusion which has been seen in so many sections, lying in the anterior fissure, or occupying the lumen of the central canal, appears quite homogeneous, and of a uniform reddish hue, under a pressure of 100 diameters. With a power of 340 diameters, we thought that in a few places we could make out indistinctly the outlines of red blood corpuscles. We consequently, though with reservation, consider the effusion as hemorrhagic.

In none of the many sections examined was any alteration of the nerve-cells of the gray matter discovered. In some sections the gray matter was seen to contain abnormally large vessels filled with blood.

The state of the spinal cord may be stated in a few words, as follows:—

The organ is in a state of inflammatory irritation, characterized by thickening of the pia mater, multiplication of its nuclei, and formation of new fibrillar tissue in the anterior fissure in various parts of the cord, mainly in the upper cervical region and in the lower portion of the lumbar enlargement. This morbid state of the pia mater is accompanied everywhere by enlargement of bloodvessels and by thickening of their external coat; in many places, besides, by rupture of small vessels, leading to effusion of blood in the bottom of the anterior fissure throughout the upper cervical region. In some places the central canal is occupied by a similar effusion. In the upper cervical region for several c. the left arm of the anterior commissure is broken up by a pathological product made up of enlarged vessels, new fibrillated tissue derived from the pia mater, and by hemorrhagic effusion. Throughout the cord there is marked cortical sclerosis. This sclerosis, most marked in the upper and lower portions of the organ, has resulted, firstly, in the production of a mass of fibrillated tissue containing numerous nuclei, and, secondly, in consecutive atrophy of the nerve-fibres lying in the meshes of the reticulum near the periphery. In the gray matter, traces of the irritative process are to be found in the shape of condensation of the tissue round about the central canal, of enlarged bloodvessels, and of one nodule of sclerosed reticulum.

Medulla Oblongata.—We have been as yet unable to study the state of this part in a thorough manner. Sections made at a point .5 c. above the end of the calamus scriptorius present the following points:—

The pia mater is somewhat thickened, and contains numerous nuclei. The floor of the ventricle is studded with granulations, most abundant and largest in the situation of posterior median fissure, having the same fibrillated structures as those found on the lateral and other ventricles, a minute description of which will be found below.

The nuclei of the hypoglossal nerves, and the cells of the restiform bodies, are normal; but a little to the outside of and above the hypoglossal nuclei, there are seen six or eight nerve-cells in various stages of granular degeneration. Some of them are mere masses of yellow granular pigment. These cells belong to the nuclei of the spinal accessory nerves. The vessels of many parts of this nervous centre are very large, and nearly all crammed with blood-corpuscles. In and about the hypoglossal nuclei, vessels measuring .15, .1, .06, 0.5 mm. in diameter are found; in the restiform bodies, vessels .05 mm. in diameter; and in one section the central part of the left olive exhibits a cavity which must have inclosed a vessel measuring .3 mm.

Ventricular Surface.—We come now to the study of the most interesting lesion of the case, viz., the granular degeneration of the general ventricular surface. We shall describe the lesion as it appeared in sections cut from the floor of the lateral ventricle perpendicularly to surface, prepared and mounted according to Clarke's method.

(*a.*) On viewing such a section with various powers the following points are ascertained: The deeper parts of the section exhibit the nuclei of neuroglia in normal numbers, and the ordinary number of bloodvessels, around which there is a moderate deposit of yellow granular matter, this being the only abnormal appearance. Next, immediately underlying the epithelium, is a layer of condensed tissue, contrasting quite sharply with that above described, and measuring, on the average, nearly .5 mm. in thickness. At several points, in the neighbourhood of bloodvessels, this condensed tissue penetrates deeper into the normal brain substance. These vessels, in the condensed layer, and in the parts immediately below, are abnormally large, filled with blood-corpuscles, and their coats are evidently thickened. The upper free (epithelial) edge of the section is quite covered with projections, these being sections of the granulations whose appearance to the naked eye has already been described. These sections vary much in outline and in size. Some present a distinct terminal nodule or head, others are cut off squarely, a few are pointed, and many are rounded. They range in height from a mere nothing to nearly .2 mm. The majority of the granules appear opaque, and the opacity extends somewhat, and in various shapes, into the subjacent tissue. In some places nothing is visible but a nodule of darker appearance than the surrounding parts, and not actually projecting through the limiting line of the section.

(*b.*) On viewing one of the non-projecting nodules with an objective magnifying 340 diameters, it is evident, at the first glance, that the epithelial lining of the ependyma remains over the entire nodule, in a better or worse state of preservation: in some places the nuclei of the epithelial cells can be distinctly seen. In reality there are here two nodules lying very near each other, a larger and a smaller one, and in the depression between the two, a certain amount of disintegration has occurred in the epithelial layer. The nodules themselves appear made up of a confused mass of delicate fibrillar tissue; the parts underlying the nodules being made up of similar fibres nearly horizontally disposed. The nodules appear separated from the other tissue by a tolerably sharp outline; and no cellular elements are visible beneath the epithelium.

(*c.*) Examining one of the large, projecting granulations we see that there is, as above described, a fibrillated substratum, horizontally disposed. The epithelium is preserved on the limiting line of section on either side of the granulation, and also for a short distance upon the granulation itself. The granulation, made up of fibrillated tissue, the fibrils of which are disposed perpendicularly to the edge of the section, projects in such a way through the remains of epithelium as at once to suggest that the growth has burst through the once continuous layer of epithelial elements. Its free edge is made up of delicate fibres, and among these are seen the outlines of oval nuclei. In the deeper parts of the granulation the fibrillation is more confused, and the nuclei are no longer distinct.

(*d.*) The examination of a minute granulation at its free edge shows a number of peculiarly shaped cells, containing very large granular nuclei, and having dissimilar ends; one narrow and thread-like running down into the granulation, the other free, rounded, or squared off. A number of analogous cells appear faintly outlined in the projecting part of the granulation below its free edge. These peculiar bodies are most probably altered epithelial cells of the ciliated variety.

(*e.*) The head, or projecting part of a granulation being snipped off with scissors, is teased to pieces in dilute chromic acid solution ($\frac{1}{1500}$), and placed under an immersion objective of $\frac{1}{15}$ inch focus made by William Wales of Fort Lee, N. J. It is at once perceived that what, under a power of 340 diameters and excellent definition, appeared as a fibrillar connective tissue, is resolved, under 1000 diameters, into a congeries of minute nerve-fibres, the majority of which bear a small quantity of myeline, the others being apparently naked axis cylinders, or amyelinic fibres; measuring on the average .001 mm. Nothing whatever in the field resembles fibrillar, connective, or reticulated tissue. There are present lying among the fibres a small number of cells and nuclei. Some of the nuclei are free, round, presenting a sharply defined outline, measuring from .005 to .007 mm. in diameter, and inclosing a prominent granule or nucleolus. The cells are ovoid, without membrane, somewhat granular (not pigmented), and exhibit nuclei similar in size and appearance to those described above. These cells measure in their long diameter, on the average, .014 mm.; in their short diameter .01 mm. In addition to these elements, there are three very peculiar, and we must admit, puzzling cells. These bear a resemblance to modified epithelial cells of the type described at *d*, but the long and slender extremities branch in a regular and remarkable manner. The heads of these cells present an irregular ovoid outline; measure in length about .018 mm., and transversely (short diameter) .01 mm. One of them contains a nucleus precisely similar to the nuclei above described. The prolongations or tails of the cells present no demarcation line from the heads, and taper gradually, giving off two to six branches. From the further, rounded end of a cell to the second subdivision of its tail, is a distance of .07 mm. Some of the smallest branches of these cells, by their uniform diameter, .001 to .0015 mm., sharp outline, and homogeneous appearance, bear the most striking resemblance to amyelinic nerve-fibres.

From this study we think it safe to say that in this patient the ventricular lesion was not due, as in Mr. Lockhart Clarke's case, to proliferation of the epithelial layer of the ependyma. The preparations all show a very distinct sub-epithelial lesion, whether of a truly sclerotic nature we cannot positively state. In favour of sclerosis we have the increase of density in the granulations themselves and in the underlying tissue to a depth of .5 mm., with thickening of the coats of bloodvessels and enlargement of perivascular spaces, in the same part. Against this view there may be advanced the absence of modified reticulum or neuroglia which is said[1] to constitute so large a proportion of the ependyma ventriculorum. Had we contented ourselves with using a power of 340 diameters, we should have honestly asserted the existence of fibrillar tissue, as making up the bulk of the granulations. The uncertainty of our study of this lesion has demonstrated to us the great want of a new investigation, with modern objectives, into the normal histology of the walls of the ventricular cavity.

Sections made through the aqueduct of Silvius exhibited granulations of precisely similar constitution. It will be remembered that in the preparations from the medulla oblongata, granulations of the same appearance were seen to spring from the floor of the fourth ventricle.

The lesion of the general ventricular cavity may be summed up as follows: A condensation of the sub-epithelial tissues, with perivasculitis and dilatation of the vascular canals, to a considerable depth. A similar condensation immediately under the epithelial cells, affecting the form of nodules, which nodules in course of growth have burst through the epithelium, and projected into the ventricular cavity. In their development these nodules have, furthermore, set up an irritation in the adjoining structures which has resulted in a modification (proliferation?) of the epithelium itself; this last being, we firmly believe, a secondary and subordinate process.

Cerebellum.—Nothing abnormal is discernible in sections of the convolutions of this organ.

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[1] Virchow, Cellular Pathology, pp. 311–14. (Am. ed.)

Cerebrum.—Sections cut from one of the convolutions of the right anterior lobe, and from one of the inferior part of the right temporo-sphenoidal lobe, show no lesion beyond the presence of a few yellowish granulations along the bloodvessels.

We will only add a few words of an historical nature concerning the granular degeneration of the ventricular walls.

First observed by Bayle,[1] this lesion does not seem to have been observed with care until 1861, when Dr. J. Lockhart Clarke,[2] in studying the alterations present in a case of progressive muscular atrophy, found the fourth ventricle studded with granulations, of which he gives the following concise account:—

"The whole floor of the fourth ventricle, as already remarked, presented a very peculiar and unnatural aspect. Instead of being smooth and shiny, as in the healthy state, it was entirely paved with a multitude of granulations or small rounded eminences, which were very closely aggregated, but differed from each other considerably in size. I removed some of them for examination, first by scraping them off from the surface to which they adhered with some tenacity; and then by shaving off a section together with a thin layer of the subjacent tissue. When examined by means of a sufficiently high magnifying power, the granulations or eminences were seen to consist of globular aggregations of the ordinary epithelial cells, which, in a natural or healthy state, are arranged side by side, and form a smooth or level surface on the floor of the ventricle. The tissue immediately subjacent, and which consists of exceedingly fine fibres proceeding from the tapering ends of the epithelial cells and running in various directions, was more abundant than usual; and—as might be expected from the homologous relation of this part to that which surrounds the spinal canal—they were interspersed with corpora amylacea, but certainly not to a corresponding extent."

The same granular condition of the ventricular surface was, about the same time, attracting the attention of a French alienist, M. Joire, who, early in 1861, submitted to the Paris Academy of Medicine[3] a paper in which he stated that he had found this condition only in cases of general paralysis of the insane, and advanced the view that this was a characteristic lesion of the disease. In the *Gazette Médicale* for 1864, page 528, is an abstract of a second paper, by M. Joire, published in the *Bulletin Médical du Nord,* in which he describes the appearances to the naked eye of these granulations. He states that the parts underneath the epithelial layer are softer and more translucent than usual. This condition often coincides with dropsy of the ventricles, and subarachnoid effusion. In early stages the granulations are small, numerous, and remind one of grains of sand. In old cases the granulations are larger, whitish, or transparent, and produce a feeling of roughness under the finger. The lesion is most common over and round about the calamus scriptorius. Finally, M. Joire claims that the lesion is constant in general paresis. In this abstract there is no evidence whatever of the microscope having been used.

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[1] Bayle, Traité des Maladies de Cerveau et de ses Membranes. Paris, 1826, p. 464. [Quoted by Clarke.]

[2] Dr. J. L. Clarke and Dr. Gairdner, Relation of a Case of Muscular Atrophy, Beale's Archives of Medicine, vol. iii. p. 1, 1861. London.

[3] Joire. Bulletin de l'Académie Impériale de Médecine, séance du 19 Février, 1861, p. 395.

Griesinger,[1] in his classical treatise, merely observes that in chronic hydrocephalus the ependyma of the ventricles is very often found covered with granulations, thickened and denser than normal, and as resisting as leather.

We find the following in Leidesdorf:[2] In senile hydrocephalus there is found a thickening of the ependyma of the ventricles, as part of the general thickening of the neuroglia, giving rise to a granular appearance. Under the head of new-formations this author mentions, without details, granulations of the ventricles which are derived from connective tissue.

Maudsley[3] merely quotes Clarke and Joire, denying the latter's assertion concerning the meaning of the lesion. In Dr. Blandford's[4] new book the following passage occurs:—

> "Granulations of the lining membrane of the ventricle have been thought by M. Joire to be peculiar to general paralysis, which they are not. They have been observed in old-standing cases of mania, or dementia, together with similar granulations of the pia mater of the parietal and occipital lobes and medulla oblongata. They are, no doubt, an aggregated and abnormal condition of the epithelial cells, and seem to contain a homogeneous substance, probably exuded lymph."

Rindfleisch[5] speaks of granulations, like dew-drops, occurring on the ependyma of the ventricles, more particularly upon that of the fourth ventricle, in cases of chronic hydrocephalus, epilepsy, masticatory spasm, disorders of speech. He considers them as made up wholly of fibrillar connective tissue, and a very few cellular elements.

Finally, we have been informed by Dr. Francis Delafield, one of the curators to Bellevue Hospital, that during the last two years he has met with this lesion about a dozen times, nearly always in connection with granulations in the pia mater. He has not, however, made any microscopical examination of these products.

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[1] Griesinger, Traité des Maladies Mentales (traduction du Dr. Doumic). Paris, 1865, p. 496.

[2] Leidesdorf, Lehrbuch der psychischen Krankheiten. Erlangen, 1865, s. 256.

[3] Maudsley, The Physiology and Pathology of Mind. Second edition. London, 1868, pp. 455–6.

[4] Blandford, Insanity and its Treatment. Am. ed., Phila., 1871, p. 121.

[5] Rindfleisch, Lehrbuch der Pathologischen Gewebelehre. Leipzig, 1869, s. 546–7.